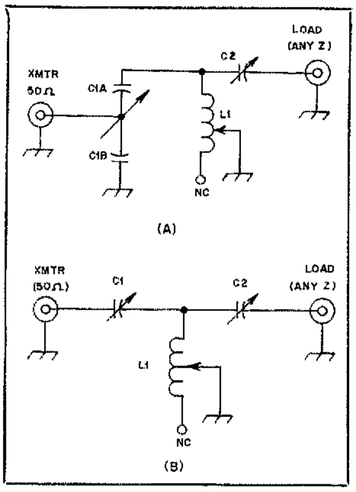


Fig. 1 — The circuit at A is found in most commercial Transmatches. It contains a dual-section variable capacitor at C1, which is not necessary for proper performance. The circuit at B is less expensive and will work as well as that at A (see text).

tained (1.5:1 to 2:1), but most of us like to shoot for a 1:1 condition when possible.

A reflected-power meter is built into the UT-2000-B. A 200-μA dc movement is used to permit good sensitivity even at low power levels. A sensitivity control enables the operator to set the meter response in accordance with the power output of the transmitter. I made comparative tests with a Bird wattmeter and learned that the Murch meter tracks very well with that of the Bird.

The function switch provides for bypassing the Transmatch, placing it in the transmission line or routing the transmitter output into a dummy load. A fourth position grounds the antenna for safety purposes during storms.

This instrument can be used with unbalanced or balanced feed lines. In the balanced condition, a toroidal transformer (broadband) converts the otherwise single-ended output to a balanced arrangement. This is useful when antennas are fed by means of twin-lead or open-wire lines. Similarly, the unit will work well with end-fed wire antennas. The maximum power rating for the Transmatch is 2-kW PEP.

Laboratory and on-the-air tests with 1 kW of dc input power to the amplifier showed no significant power loss through the unit. There was no arcing of the switches or variable capacitors, and none of the network components became unduly warm.

Craftsmanship

Perhaps the most notable aspect of this product is the craftsmanship which is evident throughout. Charlie Murch manufactures nearly all of the components he uses. The roller inductor, including its ceramic form, is made by Murch. The variable capacitors and switches are also made at the factory. The natives of this region like to refer to this kind of endeavor as "good old New England craftsmanship." This ex-Midwesterner certainly must agree with the description!

The only exception to the foregoing was noted after several weeks of daily use. The roller inductor became increasingly difficult to rotate. Eventually, the turns-counter dial no longer provided meaningful readings; the calibration became inaccurate as a result of the mechanical problems attendant to the rotary inductor.

Inspection indicated that the movable contact (small brass wheel) on the rotary-inductor coil had been binding on the brass rod that passed through its center. In fact, the binding had been so severe that the rod had developed shallow grooves that were formed by the restricted wheel during adjustment of the inductor. Excess torque had also caused the brass contact arm at the minimum-inductance end of the roller to bend and become loose, thereby allowing the small brass wheel to skip coil turns. This caused the turns-count calibration to get out of kilter. The loose parts were removed, bent back into the proper shape, then reinstalled. A thin coating of silicone grease was applied to the brass rod on which the wheel travels. This cured the binding problem and made the Transmatch much more enjoyable to use thereafter. Owners of a Murch Transmatch may want to apply silicone grease to the aforementioned area *before* the malady becomes manifest.

Who Needs a Transmatch?

For the newcomers to Amateur Radio, Transmatches are known loosely as "antenna tuners" and "antenna couplers." Some even borrow the E. F. Johnson trade name and call them "Matchboxes." Transmatches provide a matched condition between the *transmitter* and the feed line, but do not correct for a mismatch at the antenna feed point. It is important to remember this basic rule.

What a Transmatch will do for you is permit the transmitter or amplifier to look into a 50-ohm load. Most transmitters are designed for that ouput impedance. A proper match for the transmitter is especially important when using solid-state rigs, as most of them have an SWR shut-down circuit which lowers the power output as the SWR increases. Thus, if you have an antenna that has a low SWR on one end of the band, but has high SWR in some other part of the band, a Transmatch can be used to "fool" the transmitter into delivering full rated power output. I need a Transmatch at my station to work both the cw and phone bands with my tri-band trap Yagi beam. I like to think that I'm getting a bit of additional TVI protection in the process! However, there is no need for a Transmatch if you're using a properly matched antenna system. — *Doug DeMaw, W1FB*

Murch UT-2000-B Specifications

Size (HWD): 5 × 12 × 15 inches
(127 × 305 × 380 mm).
Weight: 10 lbs (4.54 kg).
Color: Two-tone gray and black.
Frequency range: 1.8 to 30 MHz.
Power rating: 2-kW PEP.
Price class: $220.
Manufacturer: Murch Electronics, Inc., Box 35, Franklin, ME 04634. Tel. 207-565-3312.

THE AEA ISOPOLE* 2-METER ANTENNA

Let's face it: The ISOPOLE is one of the most unusual antennas this reviewer has ever seen.

*ISOPOLE is a registered trademark of Advanced Electronic Applications.

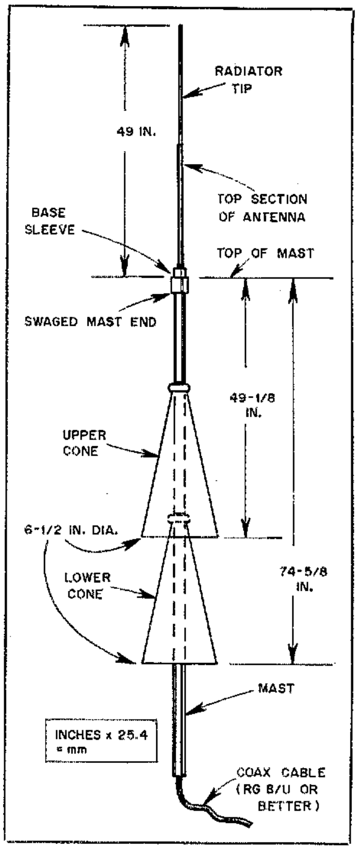


Fig. 2 — A drawing of the AEA ISOPOLE antenna. The purpose of the two cones is discussed in the text.

All the more reason to take it home and put it together.

What makes it look so different are the twin, resonant decoupling sleeves. What makes it work so well is a lot of thought given to decoupling. It is virtually impossible to sufficiently decouple an antenna feed line (and the mast on which a vertical antenna is mounted) from the antenna and thereby preserve the ideal pattern the designer had in mind. In the case of a vertical antenna mounted on a vertical mast and fed with a long vertical run of coax, it is difficult, at best, to prevent distortion of the pattern toward the horizon. Furthermore, a vertically polarized antenna that is poorly decoupled will provide horizontally polarized radiation from any horizontal components in its field, including runs of coax cable.

Each of the above factors tends to reduce the vertical gain toward the horizon, just the opposite of what one hopes to achieve with a vertically polarized 2-meter antenna. Enter the ISOPOLE.

A drawing of the ISOPOLE appears in Fig. 2. The twin, resonant decoupling sleeves are responsible for the decoupling of the antenna from its supporting mast and coax feed line. The decoupling sleeves are conical in shape (something like a small megaphone) and are mounted firmly on the supporting mast.

In fact, part of the supporting mast functions as part of the antenna. Look at it this way. The coax passes up through the mast and terminates in a female coax receptacle at the bottom of the 49-inch, two-section tube and rod that is fastened by set-screws to the top of the mast. This 5/8-wavelength section is the top part of the antenna. Above the coax connector (and part of the same weather-insulated housing) is a sealed matching network, factory adjusted, which provides broadband matching from 142 to 150 MHz. The manufacturer claims that the antenna will exhibit less than 2:1 over this bandwidth. This reviewer measured a VSWR of no more than 1.4:1 over the 144- to 148-MHz amateur band.

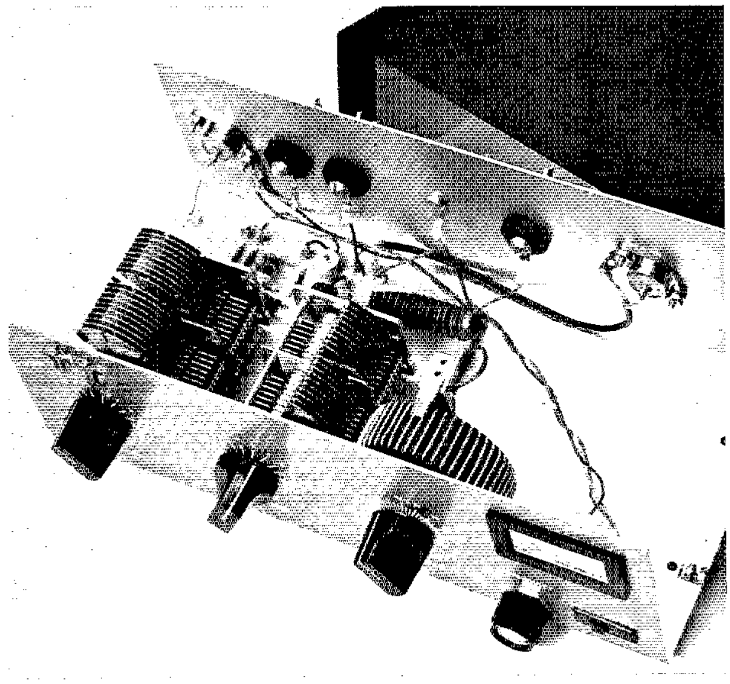
The first decoupling sleeve is adjusted so that the bottom of the sleeve is exactly 49-1/8-inches below the top of the mast. The radiating part of the antenna consists of the top 5/8-wavelength long, two-section rod and tube and the top portion of the mast down to the bottom of the first decoupling sleeve. Essentially, the active radiating part of the antenna, as described, may be looked upon as a 1-1/4-wavelength dipole. The manufacturer says it may also be referred to as "two 5/8-wavelengths in phase." The flared end (bottom) of the decoupling sleeve starts the isolation of the radiating part of the antenna from the mast. The second decoupling sleeve, fitted just below the first, completes the decoupling and effectively isolates the radiating part of the antenna from anything below it.

The ISOPOLE assembles in a few minutes on a 1-1/4-inch mast (not supplied). Maximum mast length is unlimited, though the minimum length should not be much less than 8 feet so that the antenna may be attached to its supporting structure.

As usual, this reviewer couldn't wait to mount the antenna on roof or tower. As soon as the brief assembly was completed, the mast was strapped to the railing of the rear deck of the house, about 8 feet above ground. A quick check with a quality VSWR bridge good to 150 MHz indicated no more than 1.4:1 over the entire 2-meter band. Armed with the ARRL *Repeater Directory*, and with the antenna at its commanding height of 8 feet, I proceeded to raise 29 repeaters in Connecticut from my centrally located point, along with several in Massachusetts and even a few on Long Island, approximately 50 miles distant. The remaining repeaters in Connecticut were either "down" or private. Most of the repeaters were raised with 5 watts output. Access to a few required 25 watts output for reliable contacts.

The antenna does not appear to be designed to withstand 6-inch ice loads on 10,000-foot mountains, but if you have need for an effective omnidirectional, horizon-oriented antenna you may wish to look into the AEA ISOPOLE. It appears to be ideal for modest repeater and home locations. The antenna offers a projected surface area of 1.75 sq. ft., weighs less than 3 pounds and sells for $49.95.

The ISOPOLE is available from Advanced Electronic Applications, P. O. Box 2160, Lynnwood, WA 98036. — *Lee Aurick, W1SE*



The Ten Tec model 277 Transmatch shown above employs the popular W1ICP Ultimate Transmatch circuit. Provision is made for feeding both balanced and unbalanced loads. The balun is located immediately behind the center capacitor. At the left of the SWR meter is the variable inductor. All terminals are on the rear panel.

TEN-TEC 247 AND 277 ANTENNA TUNERS

Ten-Tec is currently marketing Transmatch models 247 and 277 which are designed to match the 50- to 75-ohm unbalanced outputs of transmitters and transceivers to both balanced and unbalanced loads. What distinguishes the 277 from the 247 is that the model 277 contains a built-in SWR bridge and meter.

These Transmatches are compact and lightweight (only 3 pounds), factors that should interest the vacationer or Field Day operator. Cabinet dimensions (HWD) are 3-1/2 × 10-1/4 × 6-1/2 inches (89 × 260 × 165 mm) for the model 277. Measurements for the model 247 are 2-15/16 × 7-3/4 × 6-11/16 inches (75 × 197 × 170 mm).

The attractive enclosures make either unit a suitable desk-top accessory. Front and rear panels are finished in metallic gray. Both covers (sides and tops) are dressed in a black textured material. Operating controls for the main variable capacitors and the variable inductor are on the front panel.

Mounted on the rear of the cabinets are the PL-259 coaxial connectors which accommodate the transmitter and antenna transmission lines. Terminals are also furnished on the rear panel for a balanced transmission line, a single-wire antenna and a ground.

A decade ago, Lew McCoy, W1ICP, introduced the Ultimate Transmatch circuit. Without doubt, this configuration is the most popular antenna tuner design today. Both the 247 and the 277 Ten Tec tuners follow the W1ICP format, with the exception that Ten Tec elected not to use a differential capacitor in the input. Instead, the differential capacitor is replaced by a ganged, dual-section unit. This capacitor, however, does seem capable of handling most matching requirements.

The shunt inductance of the T-network is wound in a manner that reminds one of a rheostat, especially inasmuch as it is equipped with a rotary slider similar to that on a rheostat. By means of the slider, the operator can select the amount of inductance required for matching.

Although both Transmatch models are designed to match a variety of loads, there are some restrictions. The maximum *balanced* load from 1.8 MHz to 4.0 MHz is 600 ohms. In laboratory tests with *unbalanced* loads, 500 ohms appears to be the upper limit on 160 meters. On the other hand, tests on 80, 40 and 20 meters indicated that on these bands, unbalanced loads as high as 2000 ohms could be accommodated. Loading on 10 and 15 meters at 2000 ohms was not satisfactory. On these bands, loads of 1500 ohms and less presented no problem. After all, not many amateurs would seek to match such high impedances on these bands. Feedpoint impedances of popularly used antennas for 10 and 15 meters are well within the range of either tuner.

Being a 160-meter buff, I rather naturally tried both of these Ten Tec Transmatches on the "top band" first. Antennas that have low-impedance feedpoints (30- to 150-ohm range) proved to be no obstacle. But for the chap who wants to end feed a single-wire half-wavelength antenna on 160, use of the Ten Tec networks is out of the question. Perhaps the manufacturer will, in the future, modify the circuit to overcome this disadvantage. One competitive Transmatch producer does furnish an accessory coil that compensates for a similar shortcoming.

In order to determine the insertion loss of the